

CLAIMS

I claim:

1 1. A continuous combustion reaction engine devoid of
2 internal moving parts, comprising:

3 a forwardly disposed air inlet section, having a forward
4 end and a rearward end opposite said forward end;

5 a centrally disposed fuel injection section;

6 a rearwardly disposed, annular combustion section;

7 a large diameter, concentrically disposed exhaust gas
8 recirculation duct, extending forwardly from said combustion
9 section through said fuel injection section to said air inlet
10 section;

11 said exhaust gas recirculation duct having an open rearward
12 end communicating with said combustion section, and a forward
13 end opposite said rearward end;

14 a plurality of radially disposed pressure generators within
15 said air inlet section, defining a corresponding plurality of
16 air inlet passages therebetween;

17 each of said pressure generators having an inner end, an
18 outer end opposite said inner end, a forwardly disposed, open
19 air inlet side, a rearwardly disposed airflow passage
20 therethrough communicating with said air inlet side, and a
21 plurality of airflow guide louvers disposed within said air
22 inlet side;

23 said exhaust gas recirculation duct further having a
24 plurality of radially disposed exhaust gas passages adjacent
25 said forward end thereof, each communicating with a
26 corresponding said airflow passage of one of said pressure
27 generators;

28 an annular airflow passage surrounding said air inlet
29 section and extending rearwardly to said fuel injection section;

30 each said airflow passage of said pressure generators
31 further having an outer end communicating with said annular
32 airflow passage; and

33 a plurality of air entrainment venturis disposed in an
34 annular array about and forwardly adjacent said rearward end of
35 said exhaust gas recirculation duct.

1 2. The engine according to claim 1, further including:
2 at least one fuel pump;
3 an electrically powered fuel pump drive motor, operating
4 said at least one fuel pump during starting operations;
5 an engine exhaust powered fuel pump drive turbine,
6 operating said at least one fuel pump during operation after
7 starting; and
8 an exhaust duct extending from said exhaust gas
9 recirculation duct to said engine exhaust powered fuel pump
10 drive turbine.

1 3. The engine according to claim 1, further including:
2 a starting fuel injector disposed forwardly of each of said
3 air entrainment venturis;
4 an outlet nozzle extending from each said injector, and
5 aligned axially with airflow through the corresponding one of
6 said air entrainment venturis;
7 a run fuel injector disposed generally rearwardly of each
8 of said air entrainment venturis; and
9 a fuel deflector disposed rearwardly of and aligned with at
10 least said outlet nozzle of each said starting fuel injector.

1 4. The engine according to claim 1, wherein said pressure
2 generators are disposed in a plurality of stages extending from
3 the forward end to the rearward end of said inlet section.

1 5. The engine according to claim 1, wherein:
2 said air inlet section, said fuel injection section, said
3 combustion section, and said exhaust gas recirculation duct are
4 concentrically disposed about a longitudinal axis; and
5 said pressure generators are swept at an angle other than
6 normal to said longitudinal axis.

1 6. The engine according to claim 1, wherein said air inlet
2 section, said fuel injection section, said combustion section,
3 and said exhaust gas recirculation duct have other than a
4 circular cross-sectional shape.

1 7. A continuous combustion reaction engine devoid of
2 internal moving parts, comprising:

3 a forwardly disposed air inlet section, having a forward
4 end and a rearward end opposite said forward end;

5 a centrally disposed fuel injection section;

6 a rearwardly disposed, annular combustion section;

7 a large diameter, concentrically disposed exhaust gas
8 recirculation duct, extending forwardly from said combustion
9 section through said fuel injection section to said air inlet
10 section;

11 said exhaust gas recirculation duct having an open rearward
12 end communicating with said combustion section, and a forward
13 end opposite said rearward end;

14 a plurality of radially disposed pressure generators within
15 said air inlet section, defining a corresponding plurality of
16 air inlet passages therebetween;

17 each of said pressure generators having an inner end, an
18 outer end opposite said inner end, a forwardly disposed, open
19 air inlet side, a rearwardly disposed airflow passage
20 therethrough communicating with said air inlet side, and a
21 plurality of airflow guide louvers disposed within said air
22 inlet side;

23 said exhaust gas recirculation duct further having a
24 plurality of radially disposed exhaust gas passages adjacent
25 said forward end thereof, each communicating with a
26 corresponding said airflow passage of one of said pressure
27 generators;

28 an annular airflow passage surrounding said air inlet
29 section and extending rearwardly to said fuel injection section;

30 each said airflow passage of said pressure generators
31 further having an outer end communicating with said annular
32 airflow passage;

33 at least one fuel pump;

34 an electrically powered fuel pump drive motor, operating
35 said at least one fuel pump during starting operations;

36 an engine exhaust powered fuel pump drive turbine,
37 operating said at least one fuel pump during operation after
38 starting; and

39 an exhaust duct extending from said exhaust gas
40 recirculation duct to said engine exhaust powered fuel pump
41 drive turbine.

1 8. The engine according to claim 7, further including a
2 plurality of air entrainment venturis disposed in an annular
3 array about and forwardly adjacent said rearward end of said
4 exhaust gas recirculation duct.

1 9. The engine according to claim 7, further including:
2 a starting fuel injector disposed forwardly of each of said
3 air entrainment venturis;
4 an outlet nozzle extending from each said injector, and
5 aligned axially with airflow through the corresponding one of
6 said air entrainment venturis;
7 a run fuel injector disposed generally rearwardly of each
8 of said air entrainment venturis; and
9 a fuel deflector disposed rearwardly of and aligned with at
10 least said outlet nozzle of each said starting fuel injector.

1 10. The engine according to claim 7, wherein said pressure
2 generators are disposed in a plurality of stages extending from
3 the forward end to the rearward end of said inlet section.

1 11. The engine according to claim 7, wherein:
2 said air inlet section, said fuel injection section, said
3 combustion section, and said exhaust gas recirculation duct are
4 concentrically disposed about a longitudinal axis; and
5 said pressure generators are swept at an angle other than
6 normal to said longitudinal axis.

1 12. The engine according to claim 7, wherein said air
2 inlet section, said fuel injection section, said combustion
3 section, and said exhaust gas recirculation duct have other than
4 a circular cross-sectional shape.

1 13. A continuous combustion reaction engine devoid of
2 internal moving parts, comprising:

3 a forwardly disposed air inlet section, having a forward
4 end and a rearward end opposite said forward end;

5 a centrally disposed fuel injection section;

6 a rearwardly disposed, annular combustion section;

7 a large diameter, concentrically disposed exhaust gas
8 recirculation duct, extending forwardly from said combustion
9 section through said fuel injection section to said air inlet
10 section;

11 said exhaust gas recirculation duct having an open rearward
12 end communicating with said combustion section, and a forward
13 end opposite said rearward end;

14 a plurality of radially disposed pressure generators within
15 said air inlet section, defining a corresponding plurality of
16 air inlet passages therebetween;

17 each of said pressure generators having an inner end, an
18 outer end opposite said inner end, a forwardly disposed, open
19 air inlet side, a rearwardly disposed airflow passage
20 therethrough communicating with said air inlet side, and a
21 plurality of airflow guide louvers disposed within said air
22 inlet side;

23 said exhaust gas recirculation duct further having a
24 plurality of radially disposed exhaust gas passages adjacent
25 said forward end thereof, each communicating with a
26 corresponding said airflow passage of one of said pressure
27 generators;

28 an annular airflow passage surrounding said air inlet
29 section and extending rearwardly to said fuel injection section;

30 each said airflow passage of said pressure generators
31 further having an outer end communicating with said annular
32 airflow passage;

33 a plurality of starting fuel injectors, each disposed
34 forwardly of said combustion section;

35 an outlet nozzle extending from each of said injectors, and
36 aligned axially with airflow;

37 a plurality of run fuel injectors, each disposed generally
38 rearwardly of a corresponding one of said starting fuel
39 injectors and forwardly of said combustion section; and

40 a fuel deflector disposed rearwardly of and aligned with at
41 least each of said outlet nozzles of said starting fuel
42 injectors.

1 14. The engine according to claim 13, further including:
2 at least one fuel pump;
3 an electrically powered fuel pump drive motor, operating
4 said at least one fuel pump during starting operations;
5 an engine exhaust powered fuel pump drive turbine,
6 operating said at least one fuel pump during operation after
7 starting; and
8 an exhaust duct extending from said exhaust gas
9 recirculation duct to said engine exhaust powered fuel pump
10 drive turbine.

1 15. The engine according to claim 13, further including:
2 a plurality of air entrainment venturis disposed in an
3 annular array about and forwardly adjacent said rearward end of
4 said exhaust gas recirculation duct, between said starting fuel
5 injectors and said run fuel injectors.

1 16. The engine according to claim 13, wherein said
2 pressure generators are disposed in a plurality of stages
3 extending from the forward end to the rearward end of said inlet
4 section.

1 17. The engine according to claim 13, wherein:
2 said air inlet section, said fuel injection section, said
3 combustion section, and said exhaust gas recirculation duct are
4 concentrically disposed about a longitudinal axis; and
5 said pressure generators are swept at an angle other than
6 normal to said longitudinal axis.

1 18. The engine according to claim 13, wherein said air
2 inlet section, said fuel injection section, said combustion
3 section, and said exhaust gas recirculation duct have other than
4 a circular cross sectional shape.